



A.D. 1851 . . . . . N° 13,463.

S P E C I F I C A T I O N

OF

WILLIAM REES.

PREPARING FUEL.

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,  
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,  
25, SOUTHAMPTON BUILDINGS, HOLBORN.

*Price 8d.*

1857.







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### Preparing Fuel.

#### REES' SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM REES, of Pembrey, in the County of Carmarthen, Coal Agent, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Eighteenth day of January, in the fourteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William Rees, Her especial license, that I, the said William Rees, my exors, admors, and assigns, or such others as I, the said William Rees, my exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, in the Islands of Guernsey, Jersey, Alderney, Sark, and Man, and also within all Her Majesty's Colonies and Plantations abroad, my Invention of "CERTAIN IMPROVEMENTS IN THE PREPARATION OF FUEL;" in which said Letters Patent is contained a proviso obliging me, the said William Rees, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be inrolled in Her said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said William Rees, do hereby declare the nature of my said Invention, as follows, that is to say:—



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*Rees' Improvements in the Preparation of Fuel.*

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My Invention consists in converting small coal, or a mixture of coal and coke, into solid blocks of fuel, without the aid of extraneous cohesive matter, and the manner in which my Invention is effected is as follows :—

I take small bituminous coal, or bituminous coal admixed with coal of other qualities, or with coke. The coal or admixture of coal above described is placed in a cast-iron mould, consisting of four fixed and two moveable sides, made to fit as nearly air-tight as is practicable, the one being slightly larger than the other, as herein-after mentioned. This mould is placed in a stove or chamber heated to a temperature of from 500° to 900° of Fahrenheit's thermometer, for from thirty minutes to three hours (the time and temperature varying according to the quality of the fuel under operation, the coals containing least gaseous substances requiring higher temperature, while those containing more volatile matter require a slower and more gradual heat to arrive at the desired consistency or state which will serve for the cohesion of the mass without giving off their gases). While submitted to this operation, the coal or admixture expands until it becomes to some extent pressed by the sides of the moulds, and the constituents which would if freely exposed be formed into gases, become fused, and the whole mass brought to a soft or pulpy consistency that will retain its cohesion after becoming cool, and of the form of the interior of the mould, and of nearly the same specific gravity as before it was operated on, and in fracture resembling large coal. The desired fusion having taken place, or consistency been produced (the requisite temperature for which the operator will ascertain for the particular kind of coal employed, and cause to be indicated by the pyrometer, the moulds are removed from the stove or chamber and allowed time to partially cool. One of the two moveable sides of the mould (the larger) is then taken off, and the other is pressed down, and the block of fuel delivered from the mould fit for use.

In order to make a fuel of greater density, which is very desirable for the use of steam ships, any machine for compressing the fuel, while in a state of fusion or partial fusion, may be employed to force one (the smaller) of the moveable sides of the mould some distance within, so as to compress the block into a smaller space, which, being allowed to cool, may be removed in the manner before described. By this means a fuel of great strength and density may be produced. It is advisable to dry the coal before using it, in order to avoid as much as possible the generation of steam in the mould, but in drying the coal care should be taken not to apply a temperature sufficiently high to volatilize any of the constituents of the coal. The top of the stove or chamber may be employed to impart the requisite heat, and thus save the fuel that



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would otherwise be consumed in drying the coal separately. With a view to economise labour, I recommend the use of carriages, moving on rollers or wheels, to sustain the weight of the moulds in the stove or chamber, passing in at one end and out at the other. The stove or chamber should be of sufficient  
5 length to hold several carriages at one time, which could be made to enter and pass out singly, and at regular intervals. The size of the moulds, and number on each carriage, may be arranged to suit the convenience of the manufacturer. Ten inches by six, by four inches cube, is a convenient size for the moulds, but, where compression is adopted, they should be one half higher  
10 to produce blocks of the required size, a compression of one third of the whole being easily acquired. The moulds should taper about one sixteenth of an inch, the bottom being the wider part, in order to avoid friction in removing the blocks of fuel.

Instead of separate moulds, constructed as above described, a long and con-  
15 tinuous iron tube, of uniform section, may be employed. This tube is to be passed through and fixed in a stove, so that the central part of the tube may be heated, the upper and lower portions projecting respectively above and below the stove being cold. As the coal is filled in at the upper end iron plates are inserted at the requisite distances to divide the fuel into blocks of suitable  
20 length, and pressure being applied by a piston, the blocks, after acquiring the proper consistency from the central heat, may be forced out at the bottom of the tube.

It will be obvious that the details above mentioned may be varied according to circumstances without departing from my Invention, viz<sup>t</sup>, the heating and  
25 pressing in closed moulds or vessels the coal and coke, so that the particles may be made to cohere in masses, without the addition of any extraneous adhesive substance.

I am aware that the heating of small coal in order to soften it, preparatory to its being compressed into moulds or made into blocks, has been proposed, I  
30 therefore do not claim this as part of my Invention. But what I claim is, the confining coal, or admixture of coals and coke, in moulds or vessels that are air-tight (or nearly so), and exposing the same to heat and pressure in the manner before described, thus retaining the gaseous constituents of the coal under pressure, and causing them to aid in the fusion and ultimate cohesion of  
35 the mass into a compact fuel.

In witness whereof, I have hereunto set my hand and seal, this Twelfth day of July, One thousand eight hundred and fifty-one.

WILLIAM (L.S.) REES.

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TATE.

AND BE IT REMEMBERED, that on the Twelfth day of July, in the year of our Lord 1851, the aforesaid William Rees came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according 5 to the tenor of the Statute made for that purpose.

Enrolled the Seventeenth day of July, in the year of our Lord One thousand eight hundred and fifty-one.

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Printers to the Queen's most Excellent Majesty. 1857.